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ONLINE CASE REPORT

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Use of internal iliac artery as a side-to-end anastomosis in renal transplantation

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ABSTRACT

The internal iliac artery is less commonly used in renal transplantation in comparison to the external iliac artery due to its size and the risk of compromising distal vascular supply to the pelvis. We report a cadaveric renal transplant in which we performed a side-to-end anastomosis using the internal iliac artery. This technique can provide adequate perfusion to the transplant kidney without the associated risks and complications in the patient whose internal iliac artery is of a good diameter and quality.

KEYWORDS

Side-to-end anastomosis – Internal iliac artery – Renal transplantation

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The use of the internal iliac artery for anastomosis to the donor renal artery in renal transplantation is less favoured compared to the external iliac artery. This can be attributed to its size and the need to ligate its branches to facilitate an end-to-end anastomosis with the donor renal artery. The latter risks compromising vascular supply distally, which may lead to further complications, especially in men. We describe a cadaveric renal transplant in which we performed a side-to-end anastomosis of the internal iliac artery to the donor renal artery using a Carrel patch.

Case history

A 19-year-old man (who had had end-stage renal disease for 31 months with a primary diagnosis of childhood severe nephrotic syndrome with focal segmental glomerulosclerosis) received a right kidney from a 37-year-old female donor (1/1/0 mismatch) with two arteries on a Carrel patch, a single vein and a single ureter. Dissection of the external iliac artery revealed a non-atheromatous soft artery that was small in diameter. The dissection was extended proximally to ascertain a suitable site for anastomosis but showed that the external iliac artery would be unsuitable for an end-to-side anastomosis with the donor renal artery owing to its small diameter. Further dissection demonstrated that the internal iliac artery was not atheromatous and was much larger than the external iliac artery. Its distal branches were identified and preserved. We therefore decided to anastomose the donor renal artery using the Carrel patch on to the side of the internal iliac artery, thereby preserving the external iliac artery and distal branches of the internal iliac artery (Fig 1).

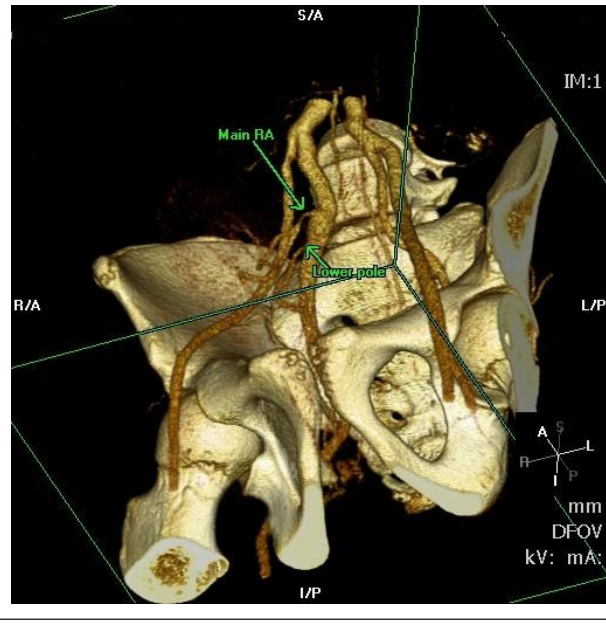

Figure 1 Computed tomography reconstruction image (renal transplant image subtracted) of donor Carrel patch anastomosed (two renal arteries – main and lower pole) to the side of the internal iliac artery. It can be seen in this image that the diameter of the internal iliac artery was greater than the external iliac artery.

RA = renal artery; A = external iliac artery; B = internal iliac artery; C = Carrell patch of renal transplant with two renal arteries

Following this, the renal vein was anastomosed to the external iliac vein in the conventional end-to-side fashion. On clamp release, there was good haemostasis and the kidney perfused well. The ureter was implanted to the bladder with an onlay extravesical ureteroneocystostomy. Immediate post-operative duplex ultrasonography of the transplant kidney showed good perfusion throughout the kidney with a good flow through the internal iliac artery. The anastomosis time was 32 minutes, total ischaemic time 14 hours and 4 minutes, and total operation time 2 hours and 25 minutes. The graft functioned immediately, with a fall in creatinine from 1,099µmol/l pre-operatively to 444µmol/l the following day. Creatinine at one week after the transplant was 106µmol/l. The patient was discharged after one week with no immediate complications.

Discussion

The use of the internal iliac artery was first described as an end-to-end anastomosis to the donor renal artery.[1] However, the evident advantages in using the external iliac artery have led to the internal iliac artery being a less popular choice. Complications arising from the ligation of the internal iliac artery, such as reduced vascular supply to the sexual organs leading to impotence and sexual dysfunction as well as buttock claudication, are well documented[2] and have made this technique less favourable. This was reflected by a questionnaire of surgeons on their attitude towards the use of the internal iliac artery, especially when the contralateral internal iliac artery had been used.[3] The results showed that 11% of surgeons would never use the first internal iliac artery and 52% would use it only infrequently.

Arterial penile blood flow has been shown to decrease following unilateral use of the internal iliac artery (which supplies the penis via its paired branches, the internal pudendal arteries).[4] This, however, does not appear to contribute significantly to the incidence of erectile dysfunction after transplantation and only becomes noteworthy when the second internal iliac artery is used for a successive transplant. Nevertheless, there are situations when use of the internal iliac artery may be warranted such as when an atheromatous external iliac artery may prevent safe anastomosis or in the case of multiple renal arteries, necessitating reconstruction of the donor renal arteries. In these situations, the internal iliac artery can be dissected distally to its bifurcation in order to use the internal iliac artery itself or its branches as an interposition graft.[5] The compromise in blood supply to the pelvis in these cases will have to be judged against the potential benefits.

To our knowledge, this is the first description of a side-to-end anastomosis of the internal iliac artery to the donor renal artery with preservation of its distal branches. This procedure appeared to be the logical decision based on our intra-operative findings. During our dissection, we could not find any explanation for the small diameter of the external iliac artery apart from the unique anatomy encountered.

There are a number of potential benefits in adopting this technique when faced with a similar situation. First, it allowed the anastomosis of a Carrel patch without affecting the diameter of either the donor renal artery or the recipient's iliac vessel. Second, as we did not have to ligate the distal branches of the internal iliac artery, blood supply distally to the pelvis was not compromised. We felt that this was a very important factor in a young male patient in order to avoid any problems relating to erectile dysfunction. Third, by avoiding clamping the external iliac artery, we could prevent the introduction of an ischaemic period in the leg, thereby possibly avoiding the effects of reperfusion injury. Finally, we preserved the external iliac artery for future use. Again, we felt that this was an important factor to consider in such a patient when one needs to preserve as much vascular access for a future transplant or haemodialysis access if required.

Conclusions

The internal iliac artery can be used successfully and safely as an end-to-side anastomosis proximal to the bifurcation of its branches in cases where the external iliac artery is unsuitable. We have shown that this method provided adequate perfusion to the transplant kidney and at the same time avoided the complications previously associated with its use.

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